

## **WORLDWIDE WEATHER RADAR IMAGERY MAY ALLOW SUBSTANTIAL INCREASE IN METEORITE FALL RECOVERY.**

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**Introduction:** Weather radar imagery is a valuable new technique for the rapid recovery of meteorite falls, to include falls which would not otherwise be recovered (e.g. Battle Mountain). Weather radar imagery reveals about one new meteorite fall per year (18 falls since 1998), using weather radars in the United States alone. However, an additional ~75 other nations operate weather radar networks according to the UN World Meteorological Organization (WMO). If the imagery of those radars were analyzed, the current rate of meteorite falls could be improved considerably, to as much as ~3.6 times the current recovery rate based on comparison of total radar areal coverage.

**Description:** Recently, the addition of weather radar imagery, seismometry and internet-based aggregation of eyewitness reports has improved the speed and accuracy of fresh meteorite fall recovery [e.g. 1,2]. This was demonstrated recently with the radar-enabled recovery of the Sutter's Mill fall [3].

Arguably, the meteorites recovered via these methods are of special scientific value as they are relatively unweathered, fresh falls. To illustrate this, a recent SAO/NASA ADS search using the keyword "meteorite" shows that all 50 of the top search results included at least one named meteorite recovered from a meteorite fall. This is true even though only ~1260 named meteorite falls are recorded among the >49,000 individual falls recorded in the Meteoritical Society online database.

The US NEXRAD system used thus far to locate meteorite falls covers most of the United States' surface area. Using a WMO map of the world's weather radars, we estimate that the total coverage of the other ~75 national weather radar networks equals about 3.6x NEXRAD's coverage area. There are two findings to draw from this calculation: 1) For the past 16 years during which 18 falls are seen in US radar data, there should be an additional ~65 meteorite falls recorded in worldwide radar imagery. Also: 2) if all of the world's radar data could be analyzed, the rate of recovery of fresh meteorite falls can increase by as much as ~3.6x the current rate.

The authors' experience to date indicates that the most effective course of action would be to have local meteorite research groups (outside of the US) form research consortia and develop a working relationship with their nation's weather bureau for access to data. These research consortia could utilize the same, proven methods used for US NEXRAD imagery, internet eyewitness report aggregation, seismometry analysis, etc. to locate meteorite falls. The consortia could then recover and analyze meteorite falls and enrich their own research efforts. It would be beneficial to conduct a global program to coordinate the development of methods and data tools, as well as to coordinate meteorite sample sharing and research. Perhaps an institution such as the Meteoritical Society could lead such an effort.

[1] Fries M. and Fries J. *MAPS* **45** (2010) 1476-1487. [2] Fries M. *et al* *44<sup>th</sup> LPSC* (2013) Abstract 2935. [3] Jenniskens P. *et al*, *Science* **338** (2012) 1583-1587.